



**Federal Aviation  
Administration**

# **Rotorcraft Operations and Statistics**



**Presented to:  
Aviation Human Factors and SMS Conference**

**by: Matt Rigsby, ASW-112**

**Rotorcraft Operations and Statistic**



# Helicopters: They Just Aren't "Normal"!!

The use and range of operations in helicopters is so diverse. More often than not they are operated independently and at the sole discretion and supervision of a single pilot. This is an awesome responsibility and the KEY to preventing accidents/incidents!!

Helicopters are used for:

- Electronic News Gathering (ENG)**

- Traffic**

- Fish spotting**

- Law Enforcement**

- Fire Fighting**

- Air Medical**

- Forest Service**

- Agricultural**

- Off-Shore**

- Seismic**

- Air Carrier**

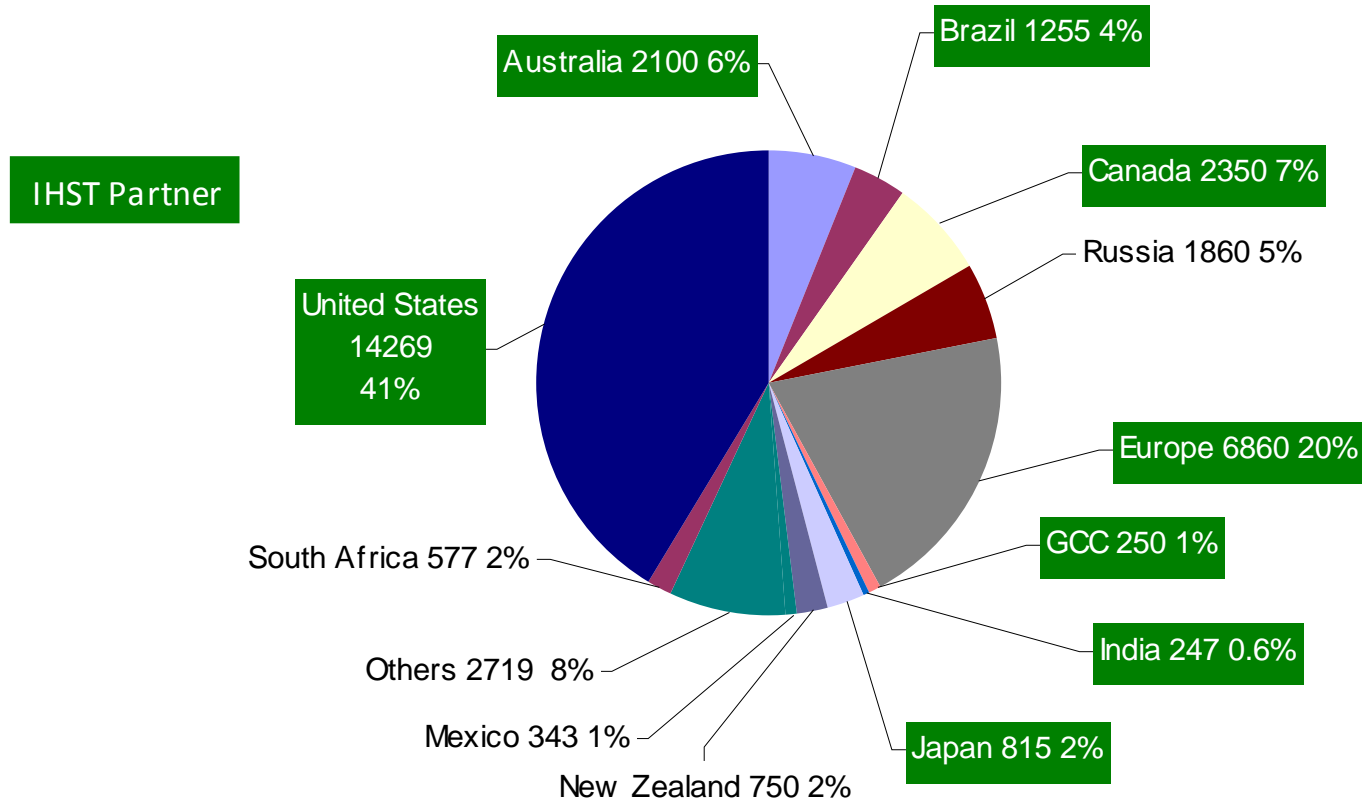
- Air tour**

- etc.....**



## Worldwide Civil Helicopter Fleet Distribution

34395 rotorcraft

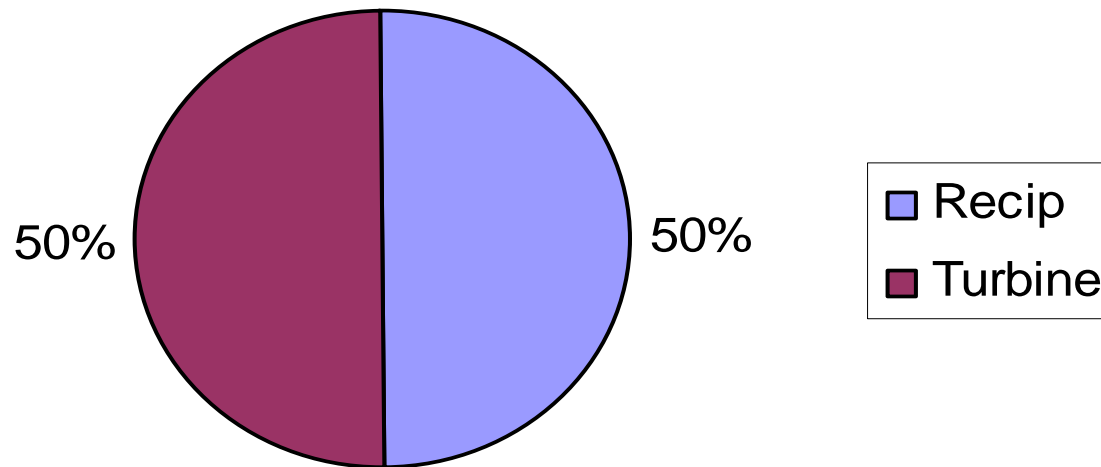


Source : IHST– Dec 2009

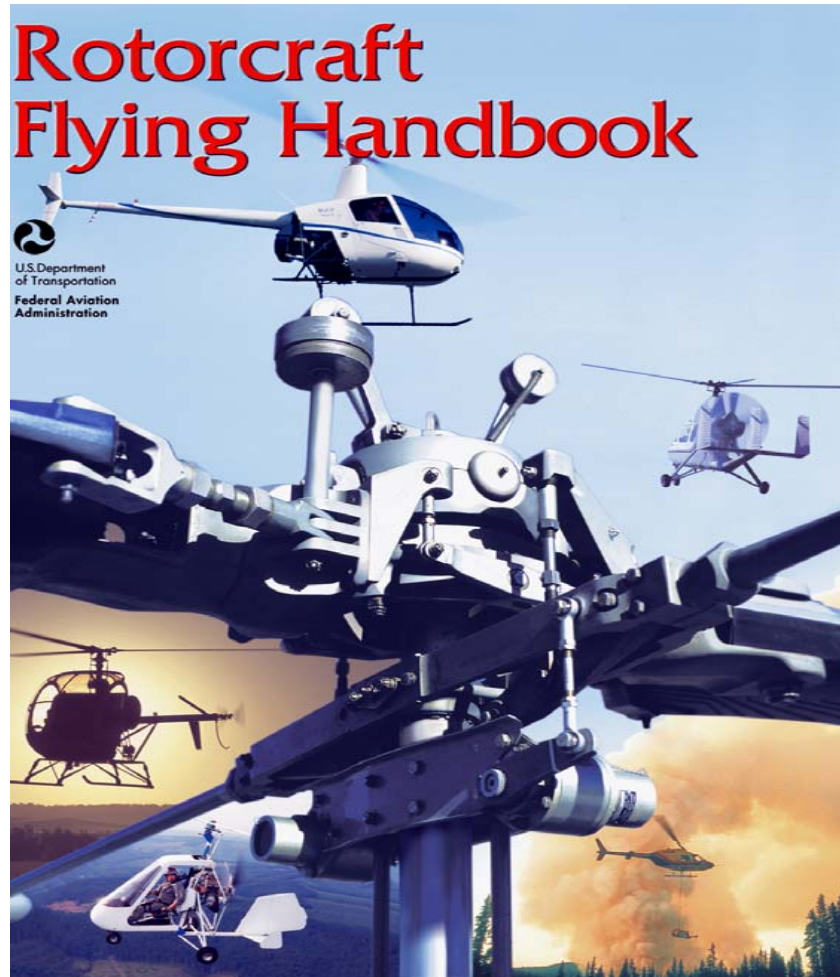
Worldwide participation is key to success

## 2011 U.S. Civil Helicopter Fleet (11,755 Total Aircraft)

Approximately 3.4 million flight hours annually.



# Where to go to find out more!!



<http://www.faa.gov/library/manuals/aircraft/media/faa-h-8083-21.pdf>

# Rotorcraft Directorate ASW-100

[http://www.faa.gov/aircraft/air\\_cert/](http://www.faa.gov/aircraft/air_cert/)



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# Airworthiness Directives Issued FY 2010

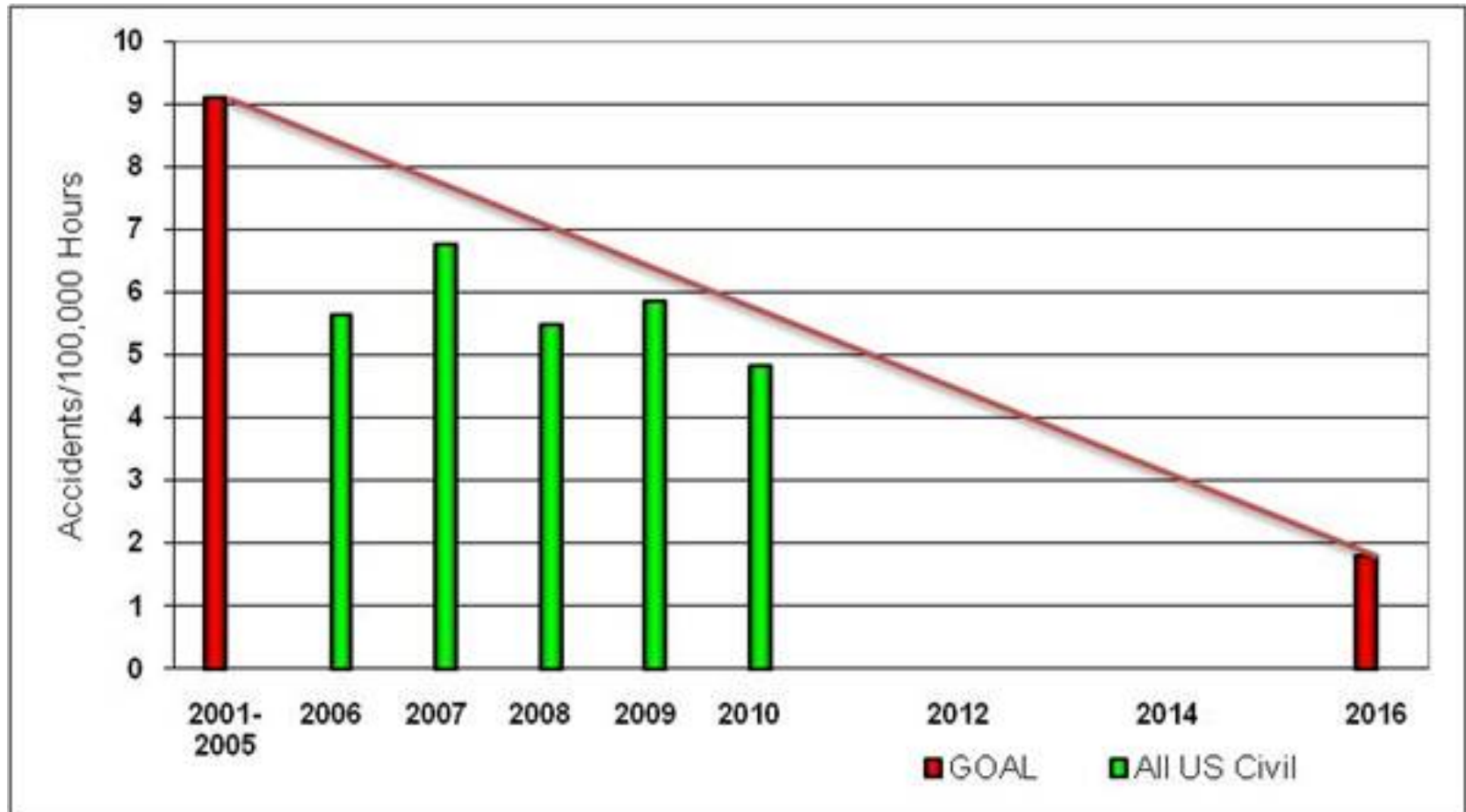
Final Rule	18
Immediate Adopted Rule	27
Emergency AD	13
Airframe	8
Tail Rotor / Drive	16
Main Rotor / Drive	24
Electrical System	5
Hoist / Hook	1
Controls	8
Aux Systems (Fire)	6
Flight Manual	2
Special Airworthiness Information Bulletins (SAIB)	6



# The Bottom Line

- We need to reduce the rate/number of rotorcraft accidents and incidents.
- The size, age, and diverse missions of the rotorcraft fleet necessitates the need to do business differently. Avg age for a helicopter in the US 24 yrs
- FAA is Committed to International Helicopter Safety Team goal of 80% reduction in accidents by 2016.

IHST **US** Registered Progress Toward 80% Goal  
(Through December 2010)





# Current IHST Toolkits

(Answers 8 of the Top 10 NTSB Recommendations or Helicopters)

[www.IHTS.org](http://www.IHTS.org)

## Helicopter Flight Data Monitoring Toolkit

- Install Cockpit Recording Devices

## Training Toolkit

- Training Emphasis for Maintaining Awareness of Cues Critical to Safe Flight
- Autorotation Training Program
- In-flight Power/Energy Management Training
- ADM Training

## SMS Toolkit

- Mission Specific Risk Management Program
- Establish mission Specific SOP and Flight OPS Oversight Program

## Maintenance Toolkit

- Follow ICA Procedures with Confirmation of Compliance

# Statistics

**They don't cause accidents,  
but they may be used to prevent them!**

# FY 11 – U.S. Registered Rotorcraft Accidents

## Cumulative Rotorcraft Accidents – 39 (6 Fatal Accidents)

Same period previous FY: 49 Total Helicopter Accidents (8 Fatal Accidents)

**Accidents:**

**Fatal:**

**Fatalities:**

Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Total
10	8	8	6	7								39
3	2	0	1	0								6
5	2	0	1	0								8

Data Source: FAA, NTSB Databases. Includes only events classified as accidents and does not include incidents. The accident numbers for each month of the Fiscal Year may vary from the previous monthly briefing based on analysis between FAA and NTSB databases for the specified month. The NTSB database may include accidents that were not reported to this office resulting in slightly different numbers.

## Accident Operations Summary (Cumulative)

**Accidents:**

**Fatal:**

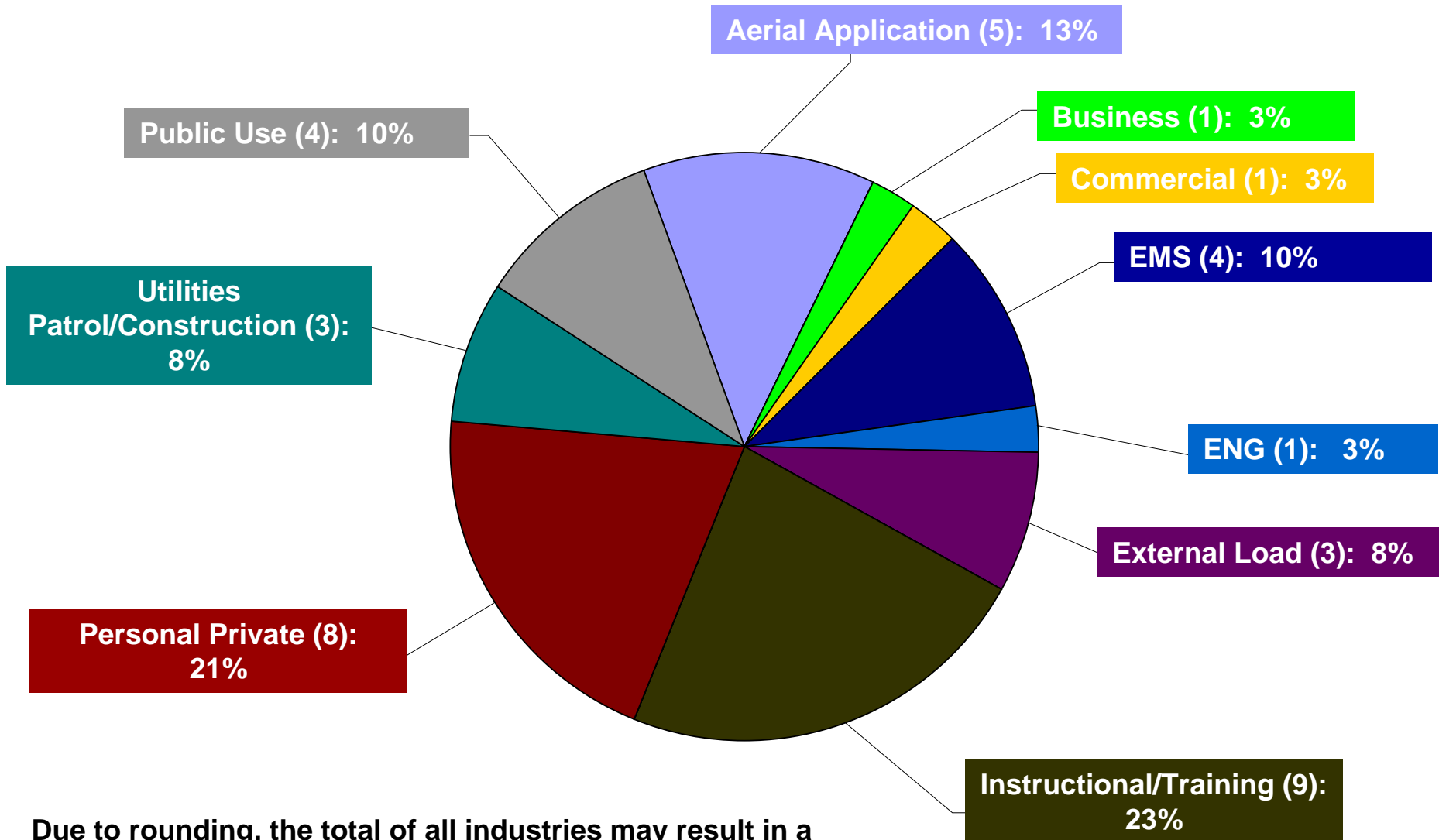
**Fatalities:**

EMS 91/ 135	GOM 91/ 135	Part 133	Part 135 Other	Air Tour 135/136	Part 137	Part 141	ENG 91/ 135	GA 91	Public Use	N Reg Outside U.S.	N Reg Military
4		4	1		5		1	17	3	3	1
0		1	0		0		0	2	2	1	0
0		1	0		0		0	2	2	3	0

\* The NTSB may have classified some Public Use accidents as Part 91, 133, or 137. Data published here may not match the NTSB classification.

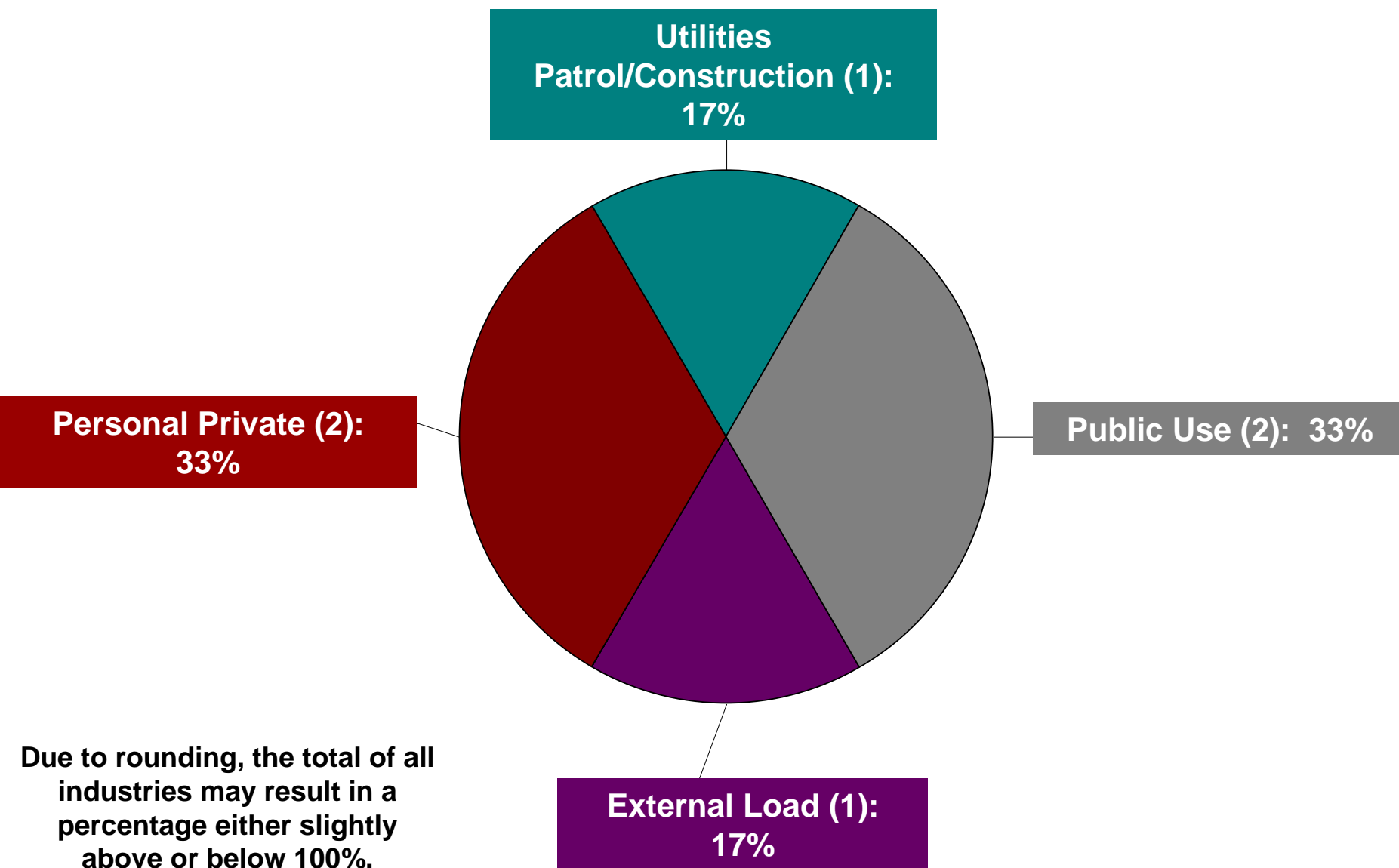
**Acronyms:** EMS = Emergency Medical Services, ENG = Electronic News Gathering, GA = General Aviation, GOM = Gulf of Mexico

# FY 11 – Total Accidents by Industry (Oct 2010 - Feb 2011)

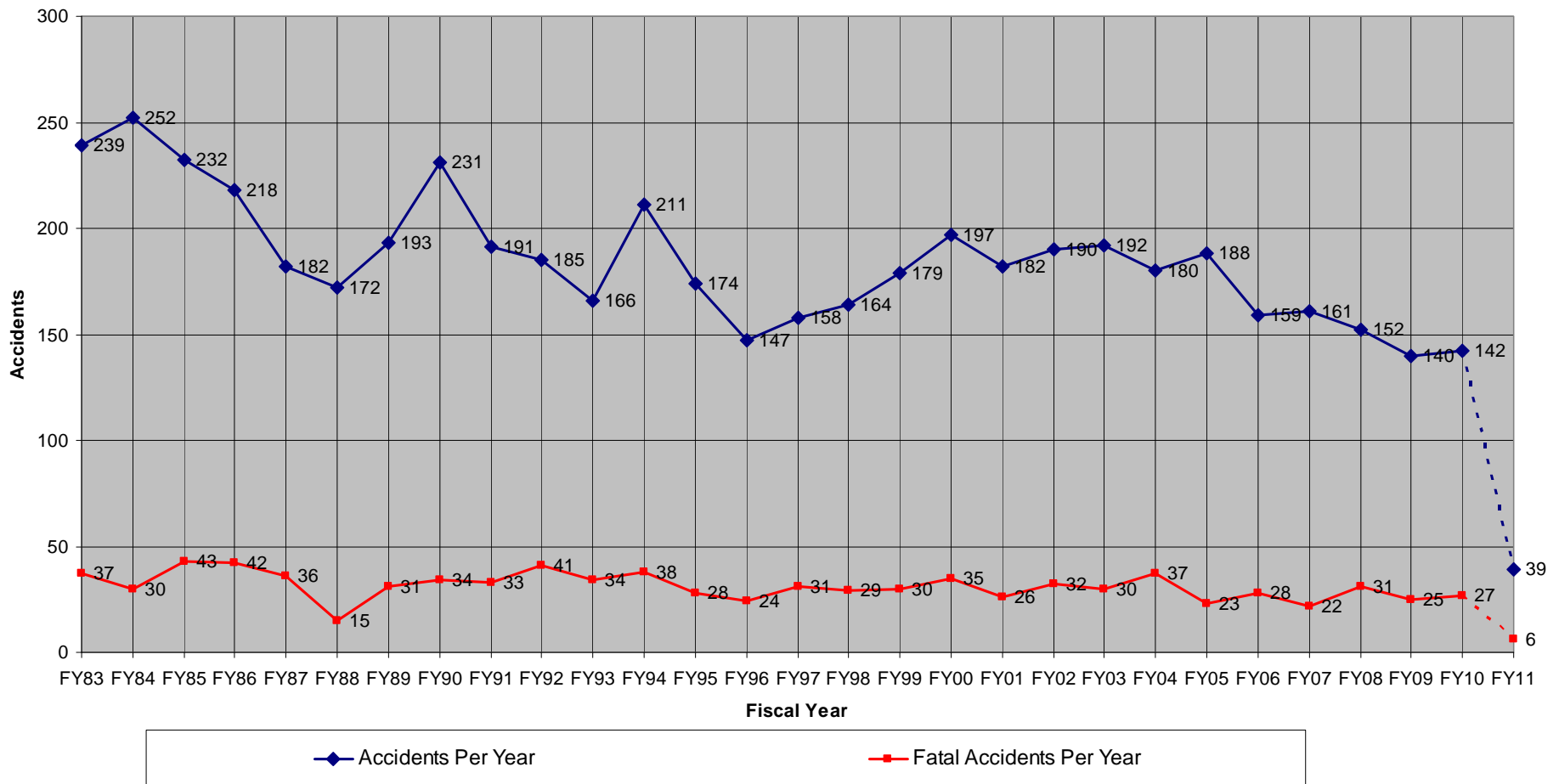


Due to rounding, the total of all industries may result in a percentage either slightly above or below 100%.

# FY 11 – Total FATAL Accidents by Industry (Oct 2010 -Feb 2011)



# U.S. Registered Rotorcraft Accidents FY83 - Feb FY11



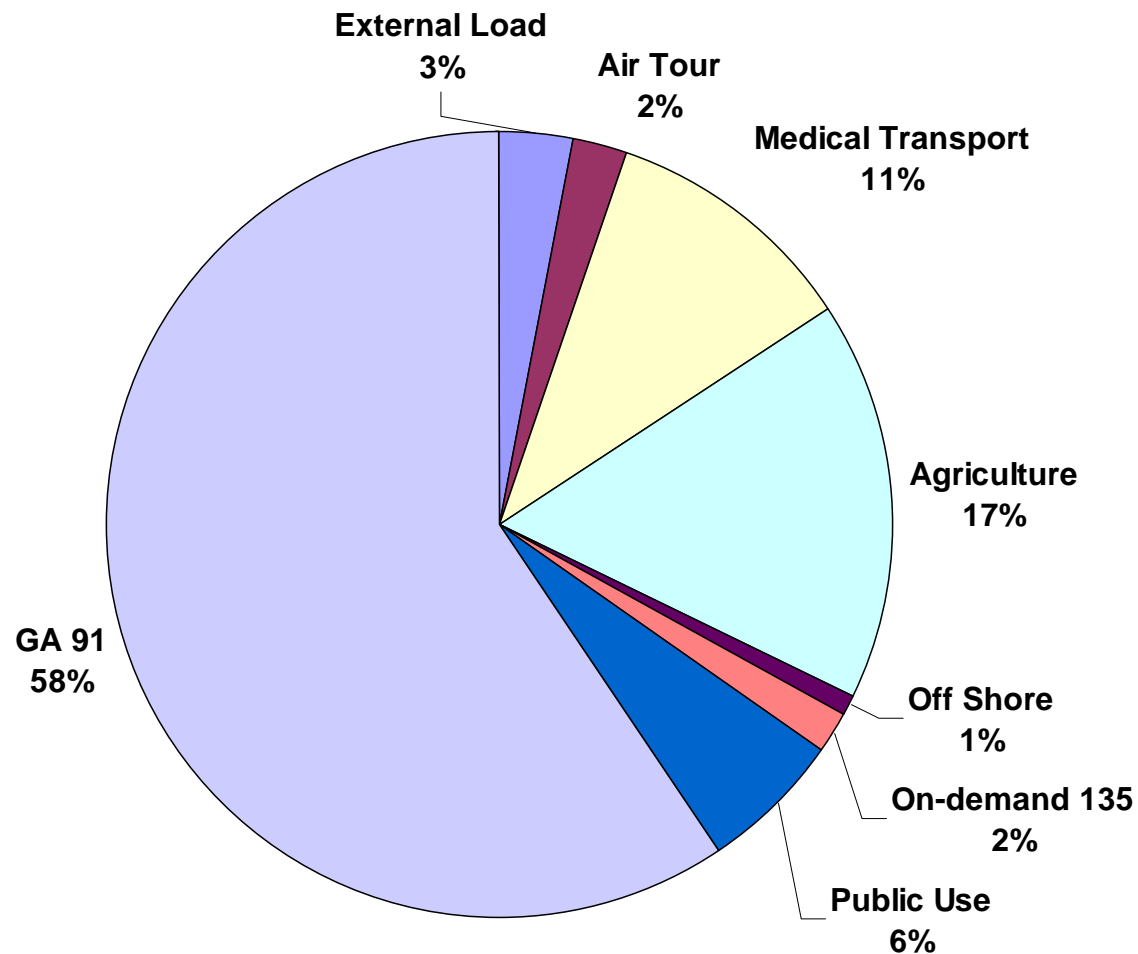
Source: NTSB data as of 3/1/2011



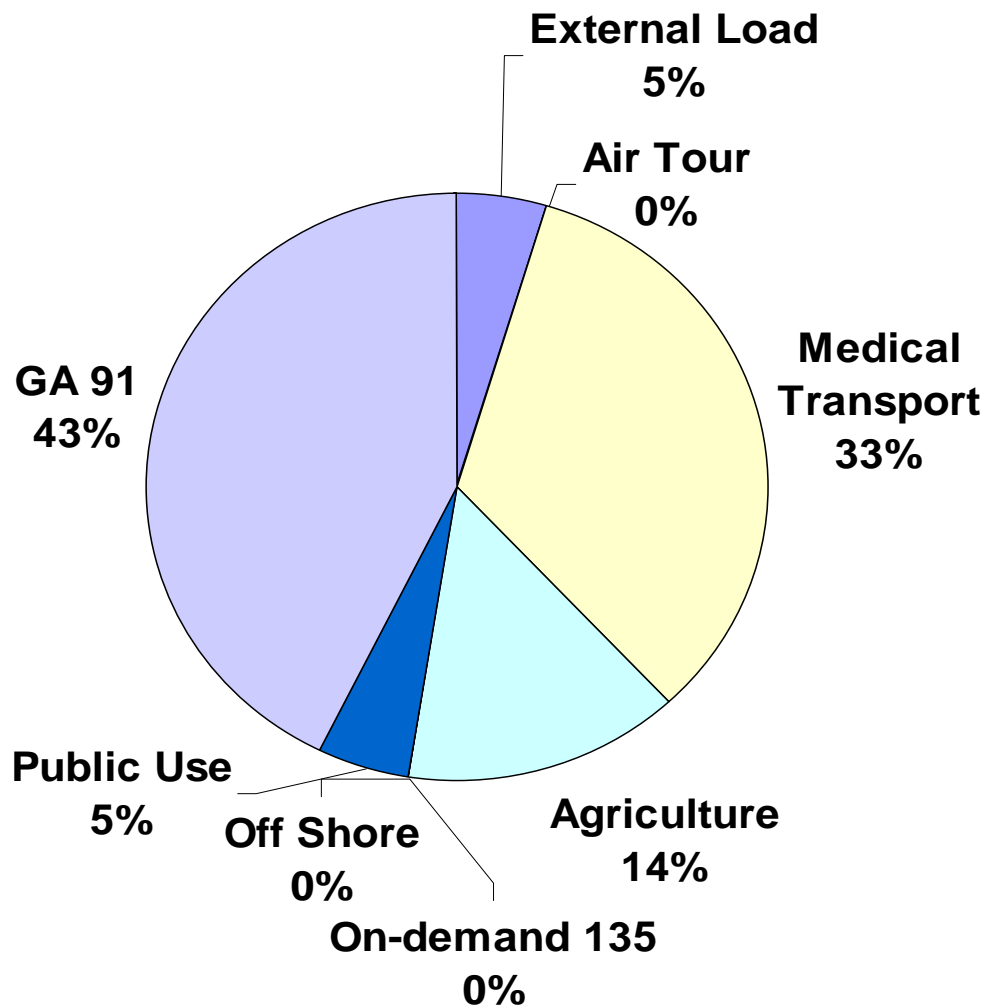
# NTSB MOST WANTED LIST – Aviation

- The FAA should:
  - Improve Oversight of Pilot Proficiency
  - Require Image Recorders
  - Improve the Safety of Emergency Medical Services (EMS) Flights
    - **Conduct all flights with medical personnel on board in accordance with stricter commuter aircraft regulations.**
    - **Develop and implement flight risk evaluation programs for EMS operators.**
    - **Require formalized dispatch and flight-following procedures including up-to-date weather information.**
    - **Install terrain awareness and warning systems (TAWS) on aircraft used for EMS operations.**
  - Improve Crew Resource Management
  - Reduce Accidents and Incidents Caused by Human Fatigue in the Aviation Industry

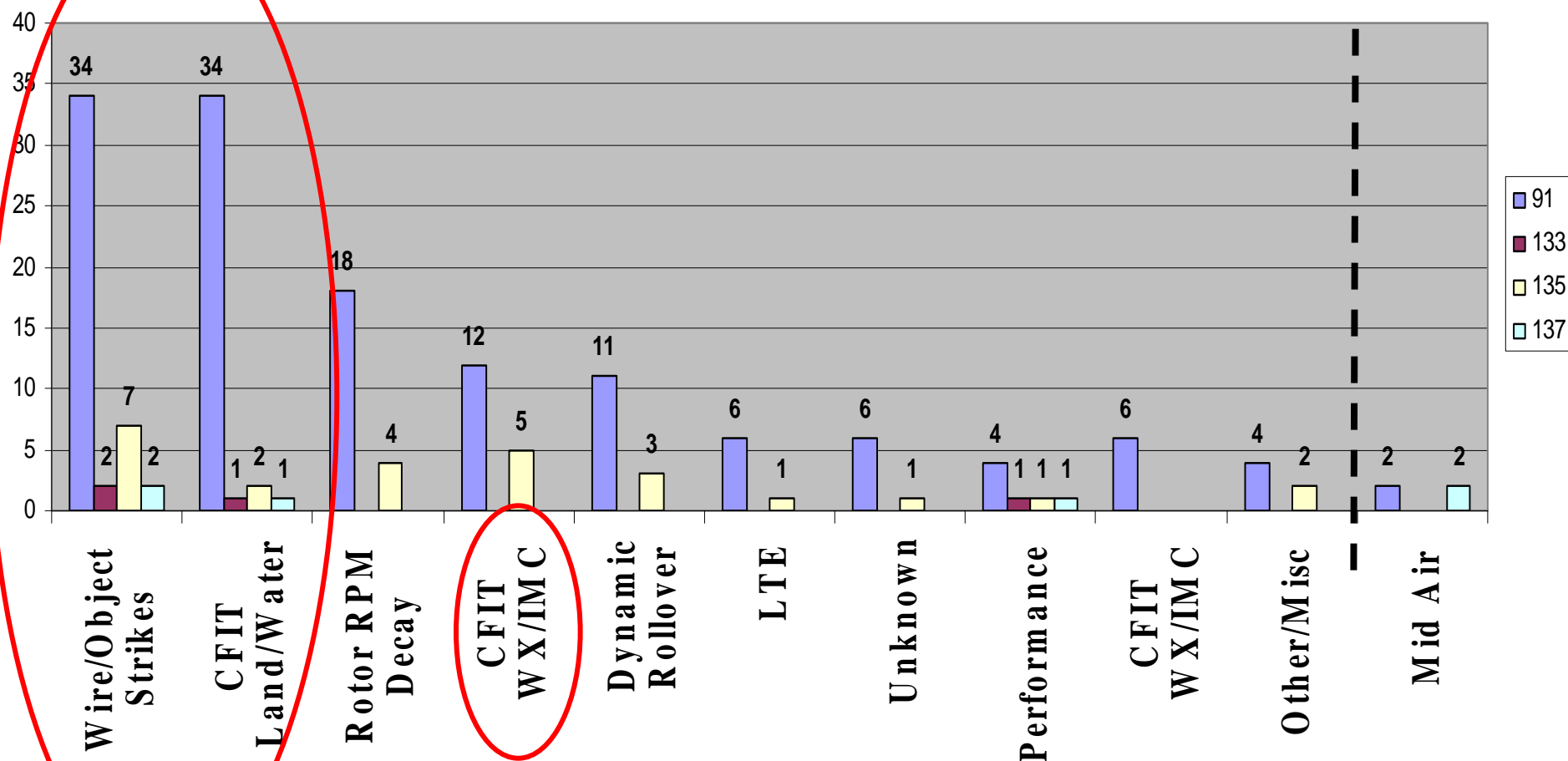
# Where the FY 10 Accidents Occurred



# Where the FY 10 Fatal Accidents Occurred

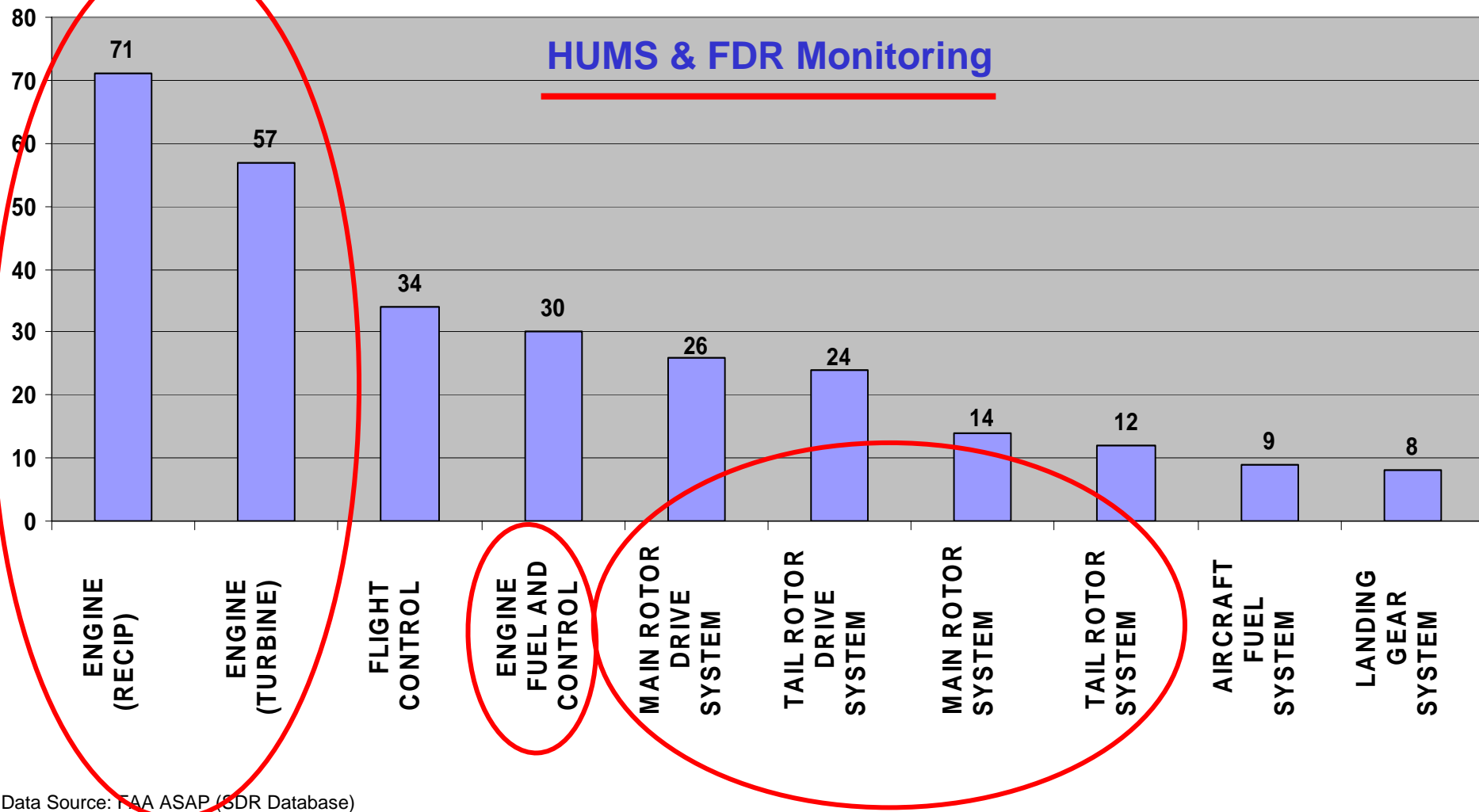


# Top Operational Causes of Fatal Rotorcraft Accidents 1996 – 2007 (+Mid airs)



Data Source: FAA ASAP (SDR Database)

# Top Ten Mechanical Causes of Fatal Rotorcraft Accidents 1996 - 2007





AS350BA Princeville, HI NTSB# NYC07MA073



MDHI 369FF Haena, HI NTSB# CHI07MA083



Robinson R44 Ponte Verda Beach, FL NTSB# DEN07FA079

**Don't forget about the  
maintenance / manufacturing side  
of the house!!!**

# Helicopter Operations



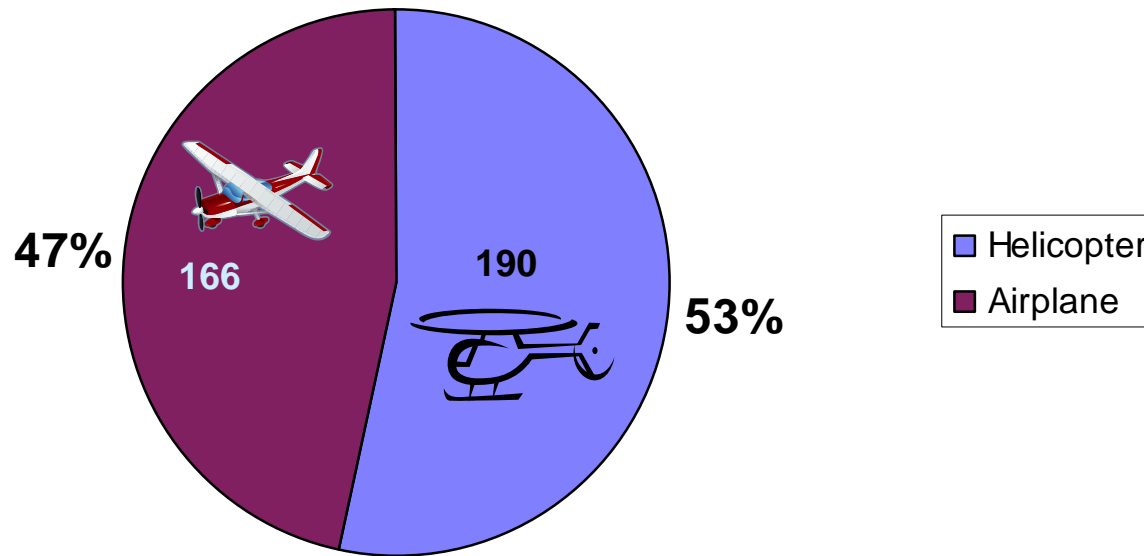
# *Air Tour*





# The Accident Numbers - Where We've Been

Air Tour 1982- Mar 07



**Total 356**

\* FAA Accident Incident Database

# The Accident Numbers - Where We've Been

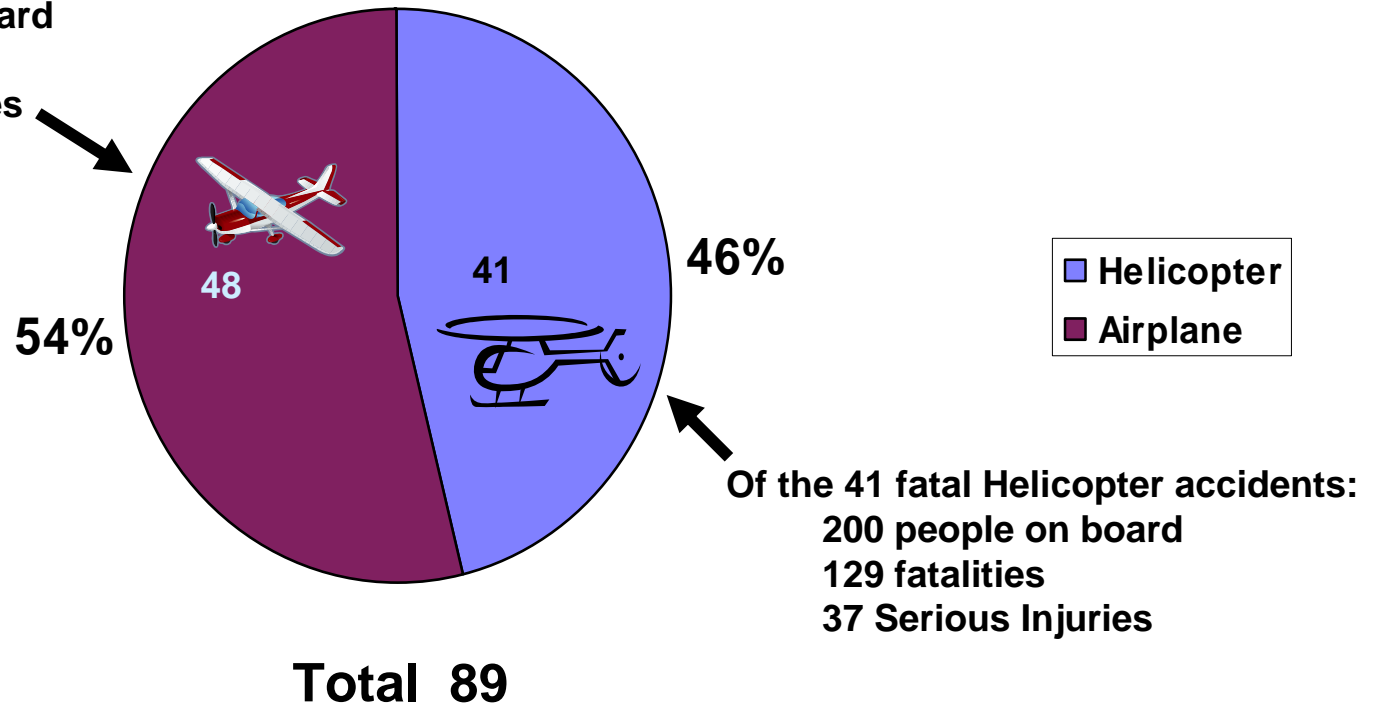
## Air Tour Fatal 1982 - Mar 07

Of the 48 fatal Airplane accidents:

266 people on board

210 fatalities

42 Serious Injuries

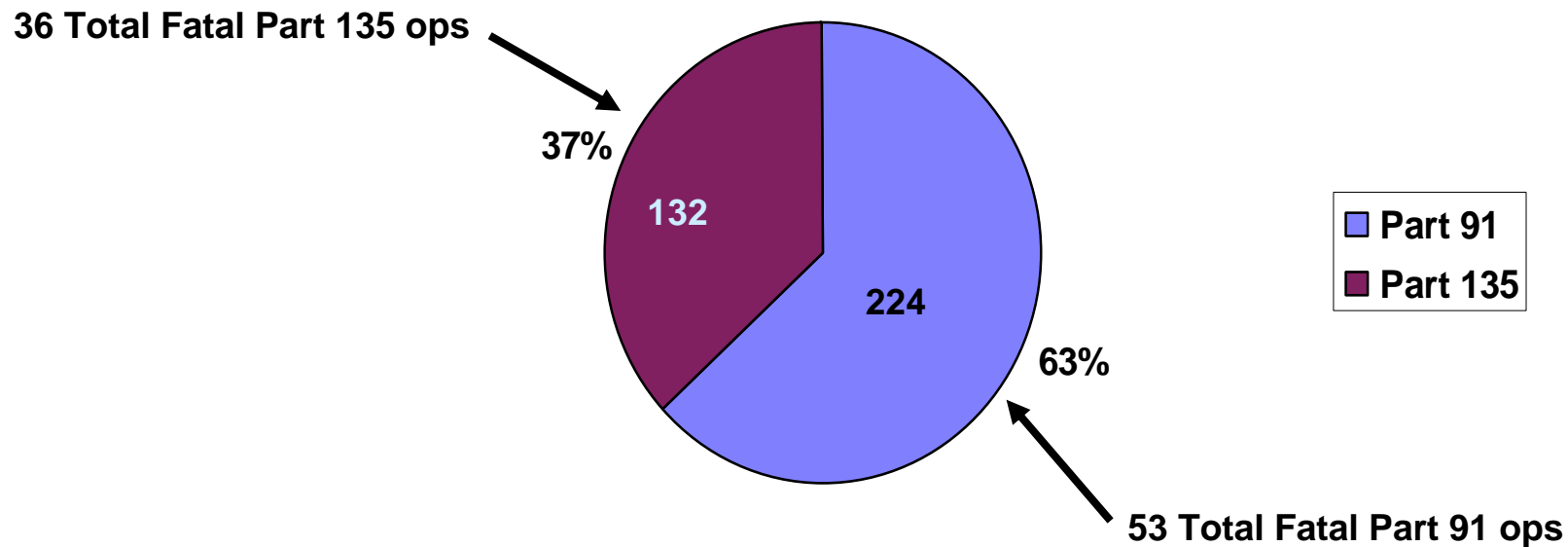


\* FAA Accident Incident Database

# The Accident Numbers - Where We've Been



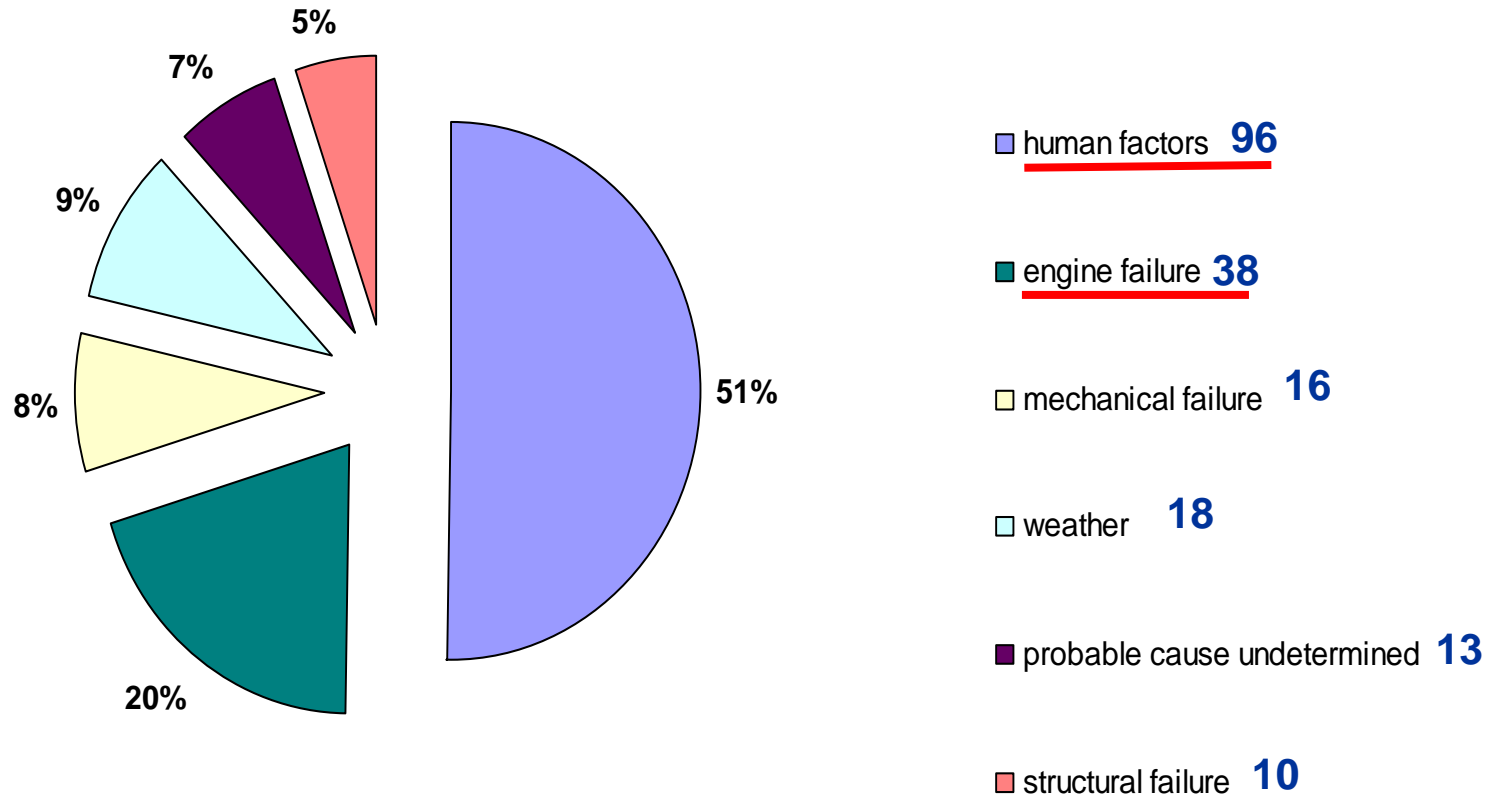
**All Air Tour 91 vs. 135  
1982 – Mar 2007**



\* FAA Accident Incident Database

# The Accident Numbers - Where We've Been

Air Tour Helicopters 1982 – 2007 191 Accidents



\* FAA Accident Incident Database

## *Electronic News Gathering (ENG)*



# Helicopter Accident Numbers

## Electronic News Gathering 1982 - 2007

Total number of Accidents	46
Incidents	10

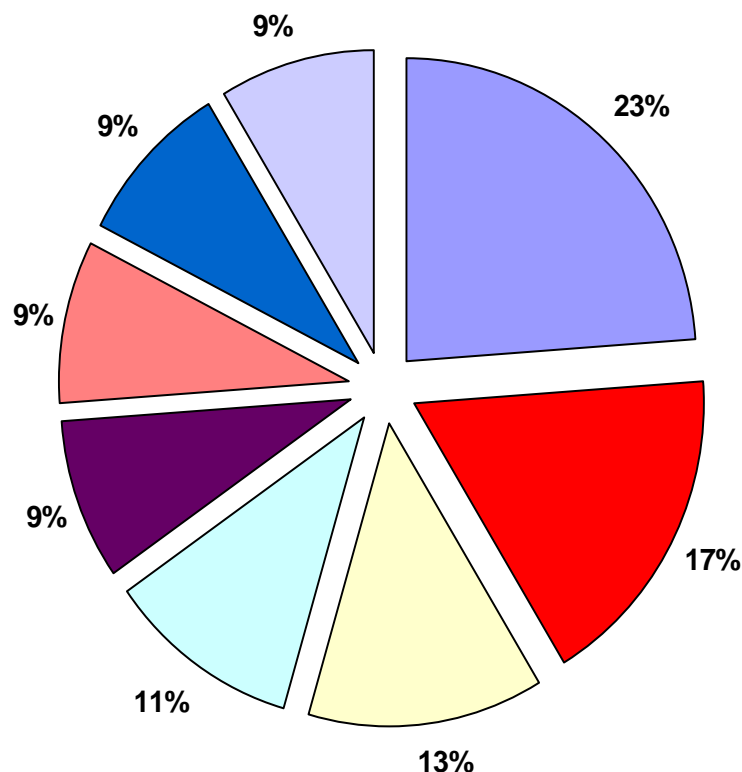
Fatal ENG Accident	14
Total Fatalities	25

Night Accidents	8
Inadvertent IMC Accidents (night)	6
(% of ENG ops at Night ??)	

<u>Part 91</u>	<u>43 (13 fatal)</u>
Part 135	3 (1 fatal)

# Helicopter Accident Numbers

## Electronic News Gathering 1982 - 2007



**46 Total Accidents**

Causal Factor      #

Mechanical	11
Power Loss	8
VFR Into IMC	6
Mid Airs	5
Improper AC control	4
LTE	4
Fuel Exhaust/Con	4
Wire strike	4



## Gulf of Mexico Operations



# Helicopter Safety Advisory Council



# Gulf of Mexico (GOMEX)

- 16,000 square miles
- 900 oil fields, 9 billion dollars generated
- 250,000 miles of pipeline
- 35,000 work force
- 3% of U.S. Gross National Product
- Deep water 200+ miles off shore is where the black gold is, that is where they are going.

Data extracted from voluntary input of 13 helicopter operators Gulf of Mexico

# Gulf of Mexico Operations CY 2008

- 13 helicopter operators, with more than 500 helicopters
- Average 3400 - 3500 flights per day.
- 4000 “Non-Public” landing sites.
- 8 hour flying days with >100 take-offs & landings.
- Deep water exploration increasing, landing on drilling boats.
- Predominately VFR operations w/some limited IFR / night ops.
- 2008 – Fewest Total Accidents since 1984 (first year tracked).

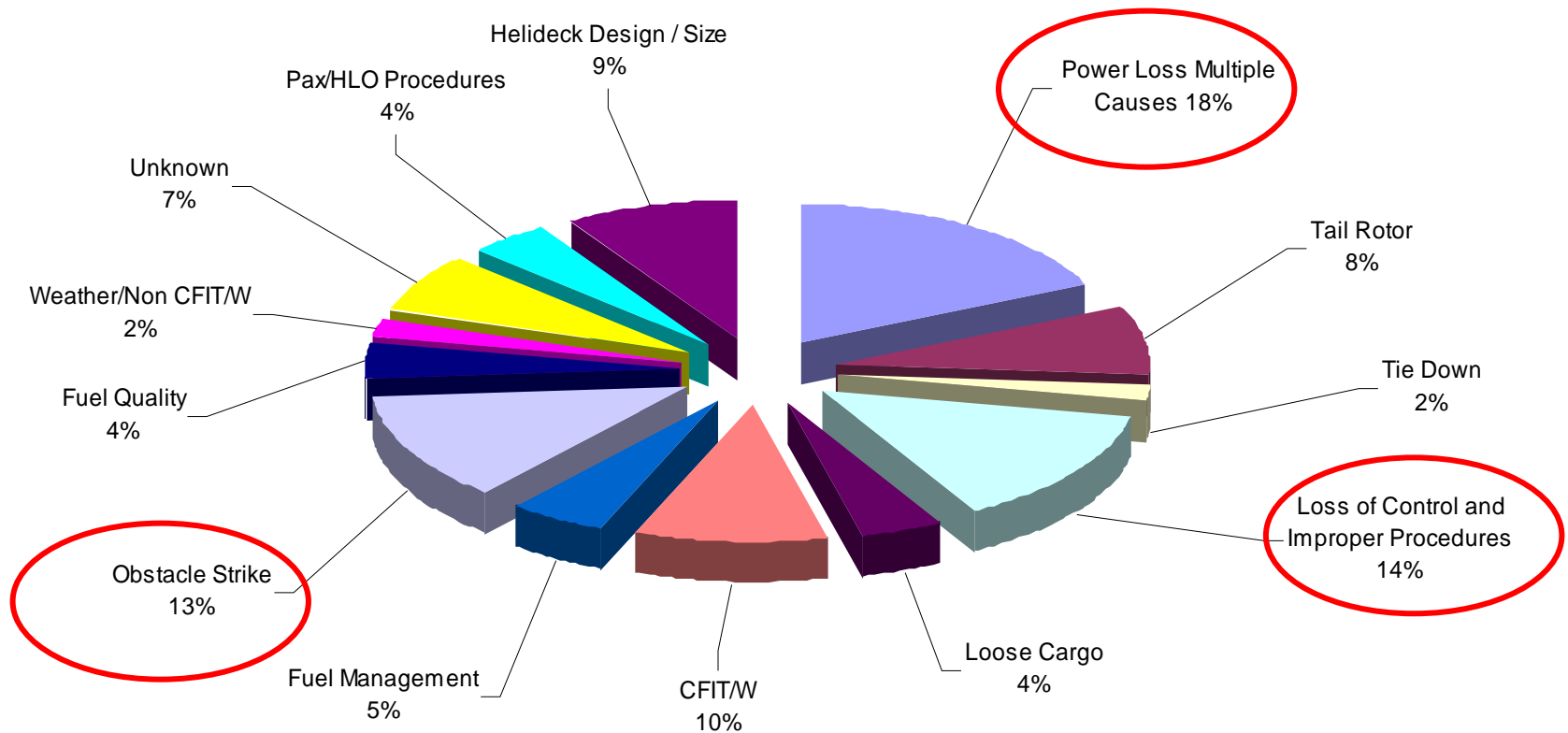
# Gulf of Mexico Offshore Helicopter Operational Data CY 2008

- 2,936,772 passengers carried for hire
- 410,321 hours flown by 13 operators
- 1,245,770 flights taken
- 20 minutes average flight time
- Heavy twin helicopters are increasing in number.

Data extracted from voluntary input of 13 helicopter operators Gulf of Mexico

\*2008 had fewest total accidents since HSAC began gathering statistics in 1984

# Gulf of Mexico Accident Causes 1999-2008



Data Source: HSAC Safety Statistics

## Expected Benefits from ADS-B

- **Provide domestic-type Air Traffic Control Services in the Gulf of Mexico**
- **Increased airspace capacity by using traditional separation standards as compared to current “grid system”**
- **Enhanced safety through better air-to-ground communication, surveillance, and weather reporting capabilities**
  - Shared situational awareness with air traffic control and pilots
  - Mitigate effects of weather on operational decisions
- **Improved efficiency under instrument flight rules**
  - Direct routing will cut en-route flight times

# Gulf of Mexico: Low Altitude



- **Low Altitude**

- Increased ability to fly IFR operations
- Fewer encounters with hazardous weather
- Improved search and rescue



# Gulf of Mexico Memorandum of Agreement

Signed May 2006

49 Total  
Partners



ADS-B



99% of helicopters

97% of platforms





# Helicopter Emergency Medical Services (HEMS)

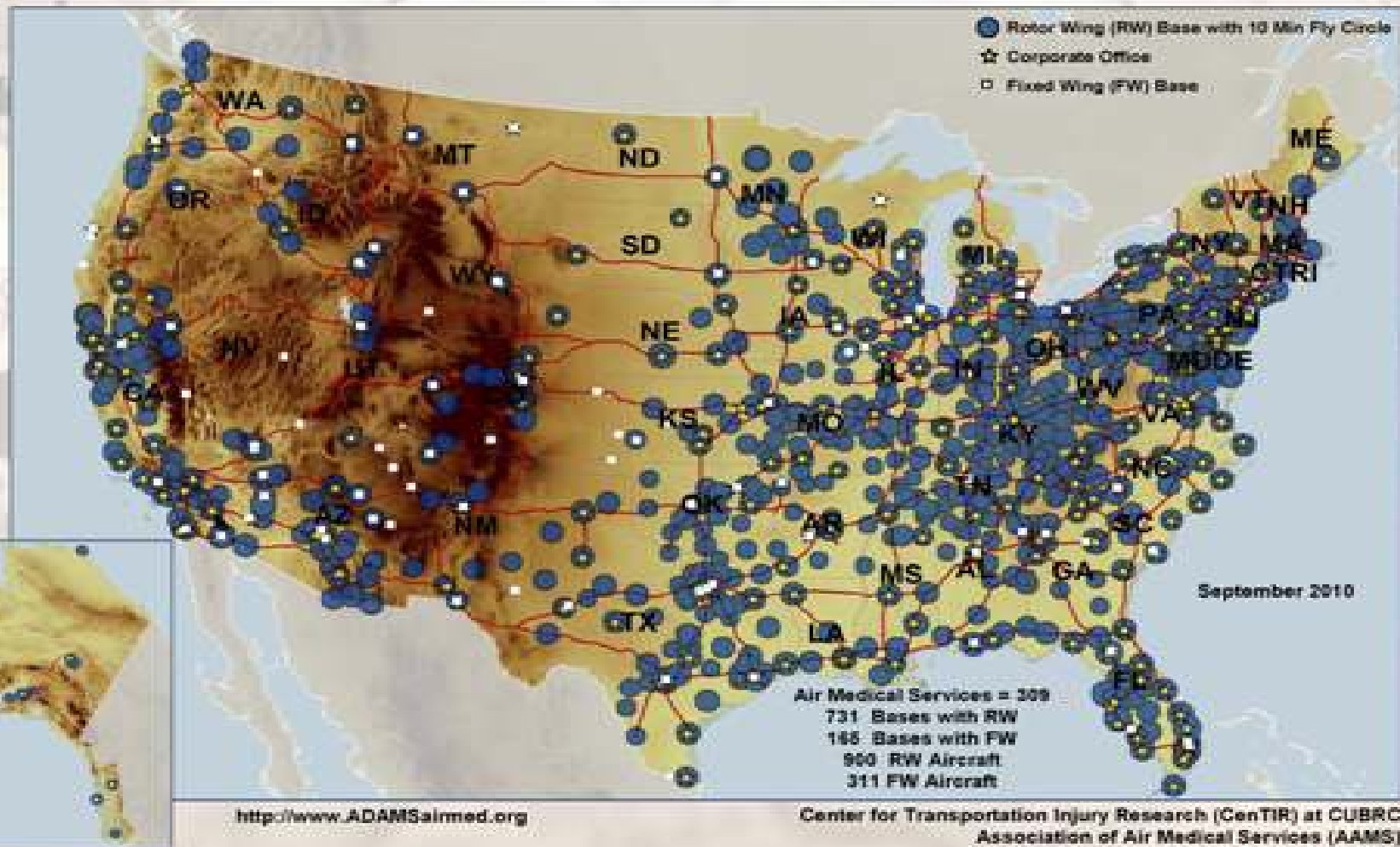
# HEMS Growth

- From the mid 1990's to present, HEMS increased +300%
- Currently, there are approximately 840 RW aircraft flying HEMS, that number is increasing daily.
- Estimates of +400,000/hrs annually.
- Approximately 500,000 patients transported annually.
- An EMS aircraft takes off every 90 seconds in the United States.
- No formal method of tracking, hours, missions, usage.
- HEMS medical is changing to the “Independent Provider” model.

# Atlas & Database of Air Medical Services

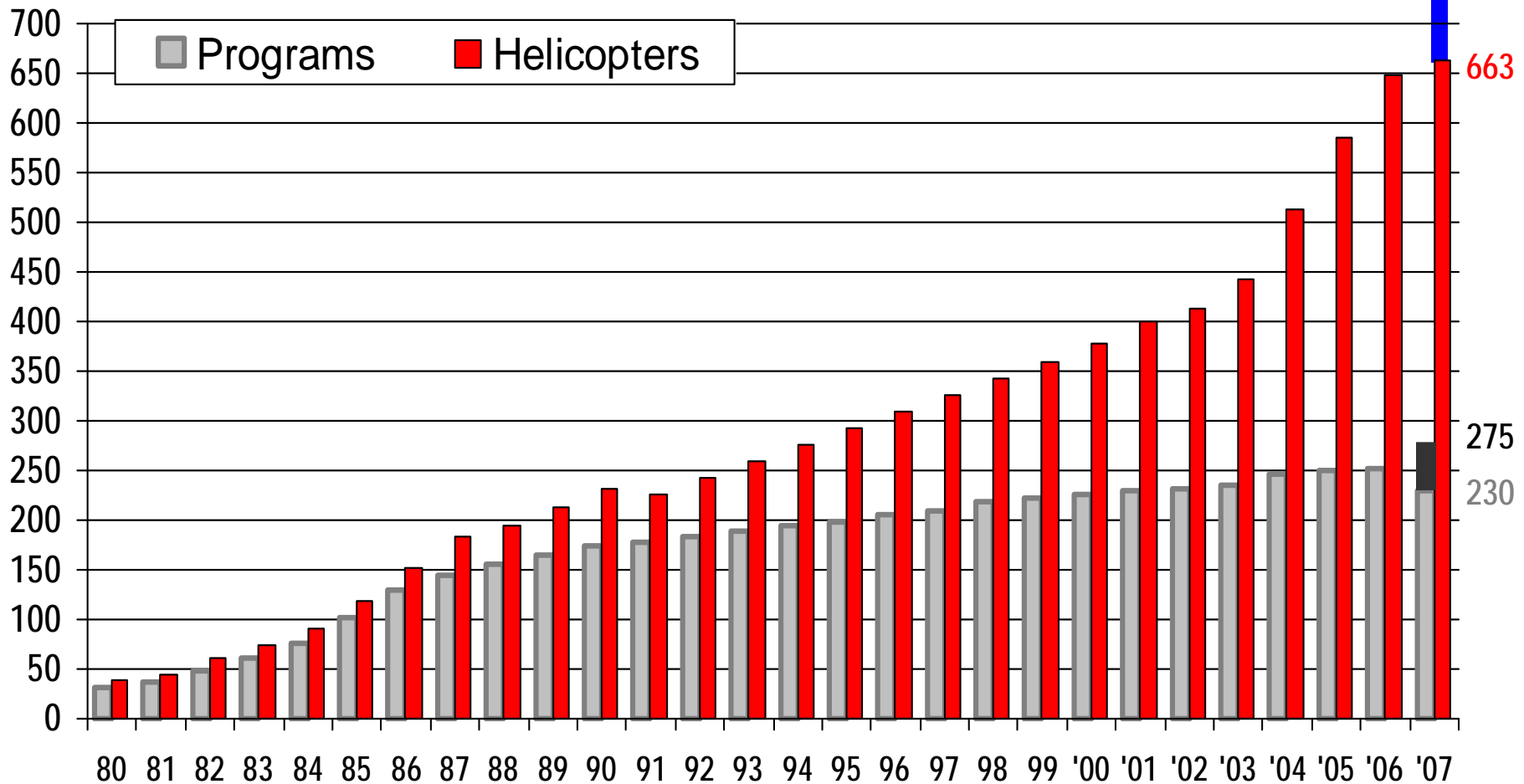
8<sup>th</sup> Edition National Air Medical Services GIS Database

ADAMS 2010



# HEMS Programs and Helicopters

\* AMPA Dr. Blumen



## Industry Operations

### HEMS

- 2007 - 312 Air Medical Services
- 2010 - 309 Air Medical Services (-3)
- 2007 - 664 Bases with Rotor Wing
- 2010 - 731 Bases with Rotor Wing (+67)
- 2007 - 810 Helicopters
- 2010 - 900 Helicopters (+90)
- 2007- 11 Accidents
- 2009 - 9 Accidents  
~ 50% night

### Off Shore

- 2007 - 16 Off Shore OP/GOM
- 2009 - 12 Off Shore GOM (-4)
- 2007 - 128 Rotor Bases
- 2009 - 96 Rotor Bases (-32)
- 2007 - 606 Helicopters
- 2009 - 495 Helicopters (-111)
- 2007 - 7 Accidents
- 2009 - 8 Accidents  
~ 8% night

•Both HEMS and Off Shore ~ 400,000 Flt hrs annually

•Estimate approx. 400,000 rotor wing medical transports annually

# HEMS Business Models

## Traditional/Hospital based Program-

The hospital contracts with HEMS operators for aviation services, Pilots and MX work for operator, medical works for hospital. The aircraft may be owned or leased by the operator, hospital, or 3<sup>rd</sup> party.

## Community Based -

The helicopter is subsidized by local or state funds to provide the community with HEMS service. The respond to scenes or hospitals, the community can contract or own the service.

## Independent Provider program –

The helicopter is based either at the airport, or other location and responds to scene or hospital. No ties/contract with any one hospital. The crews work for the operator (air and med). Operator bill patient for transport and medical.

# HEMS Mission Categories

## **Scene Flight – (33% of all flights)**

Helicopter is dispatched to a remote location (scene) for patient transport

## **Inter-Facility Transport – (54% of all flights)**

Helicopter transports patients hospital to hospital

## **Special Needs – (13% of all flights)**

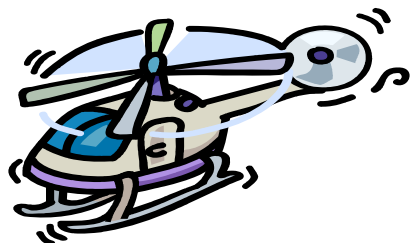
Helicopter is used for organ transport, neo-natal care and possible search and rescue.

# HEMS Night Vision Imaging Systems (NVIS)

- Aircraft Certification responsible for managing NVIS installations.
- Within the STC operational limitations are called out:
  - Type of goggle TSO-C164 / DO-275 goggles
  - Crew requirements two people on goggles going INTO unimproved areas.
- Little policy or guidance currently out there, it is being worked...
- Cockpit mods and STC changes (NVIS Checklist)
- NVIS Contact for Directorate: Clark Davenport 817-222-5151



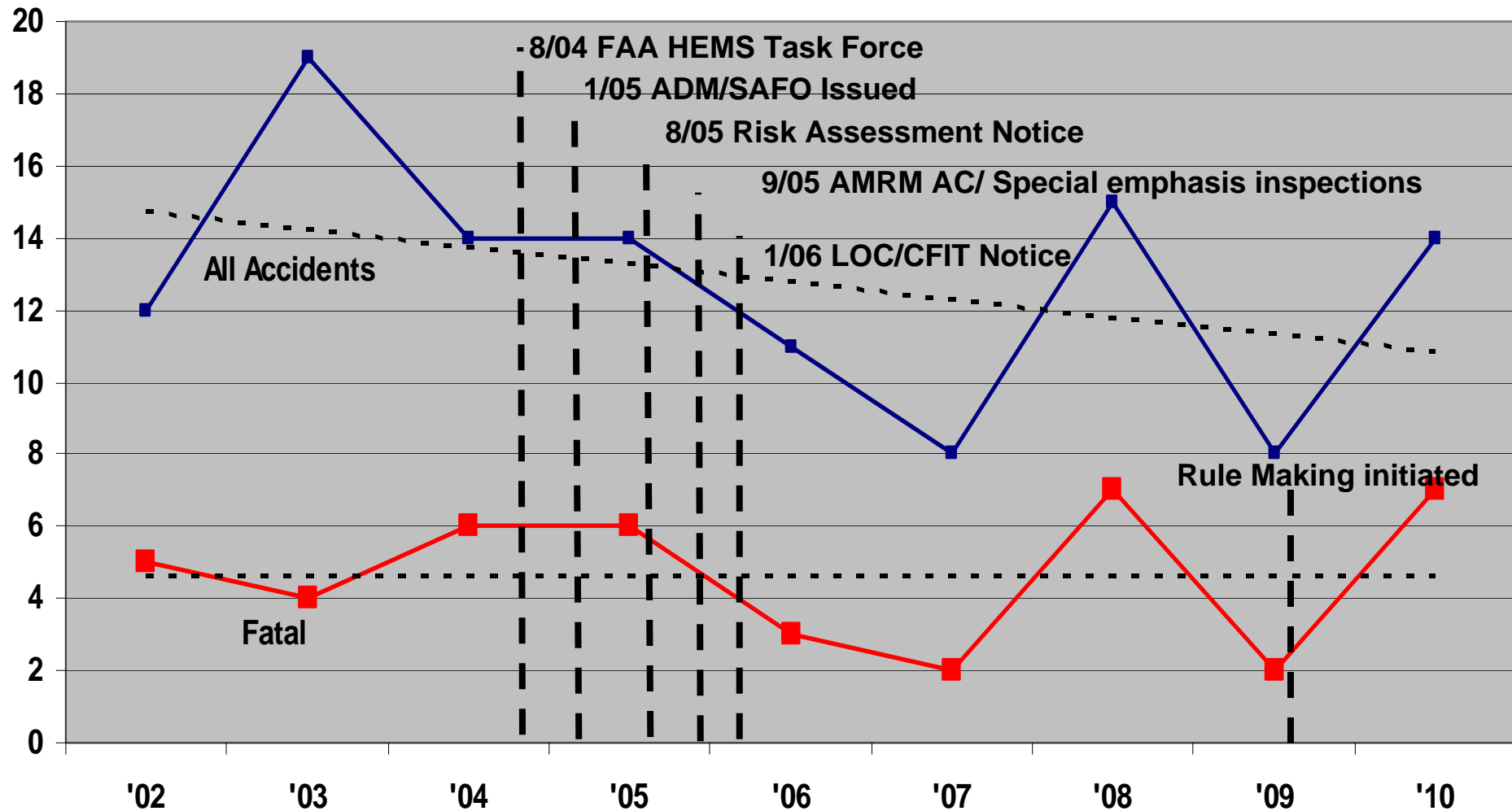
# FY06 thru FY 10 US Fatal HEMS Accidents



	<u>FY2006</u>	<u>FY2007</u>	<u>FY2008</u>	<u>FY2009</u>	<u>FY 2010</u>
<b>EMS Fatal Accidents</b>	3	1	8*	2	7
Part 135	1	0	4	1	1
Part 91	2	1	4	1	6
<b>EMS Fatalities</b>	3	3	31	7	19
Part 135	1	0	19	4	3
Part 91	2	3	12	3	16

\*= mid-air between 2 HEMS counted as 1 accident

# Trends In HEMS Accidents/Fatal accidents 2002 - present



## Helicopter Air Ambulance and Commercial Helicopter NPRM

- Notice of Proposed Rulemaking (NPRM) published on Oct 12, 2010 (75 FR 62640)
- Can be found on Federal Register website
- <http://www.gpoaccess.gov/fr/index.html>
- Comments closed January 10, 2011.
  - This is a formal process
  - Use the docket

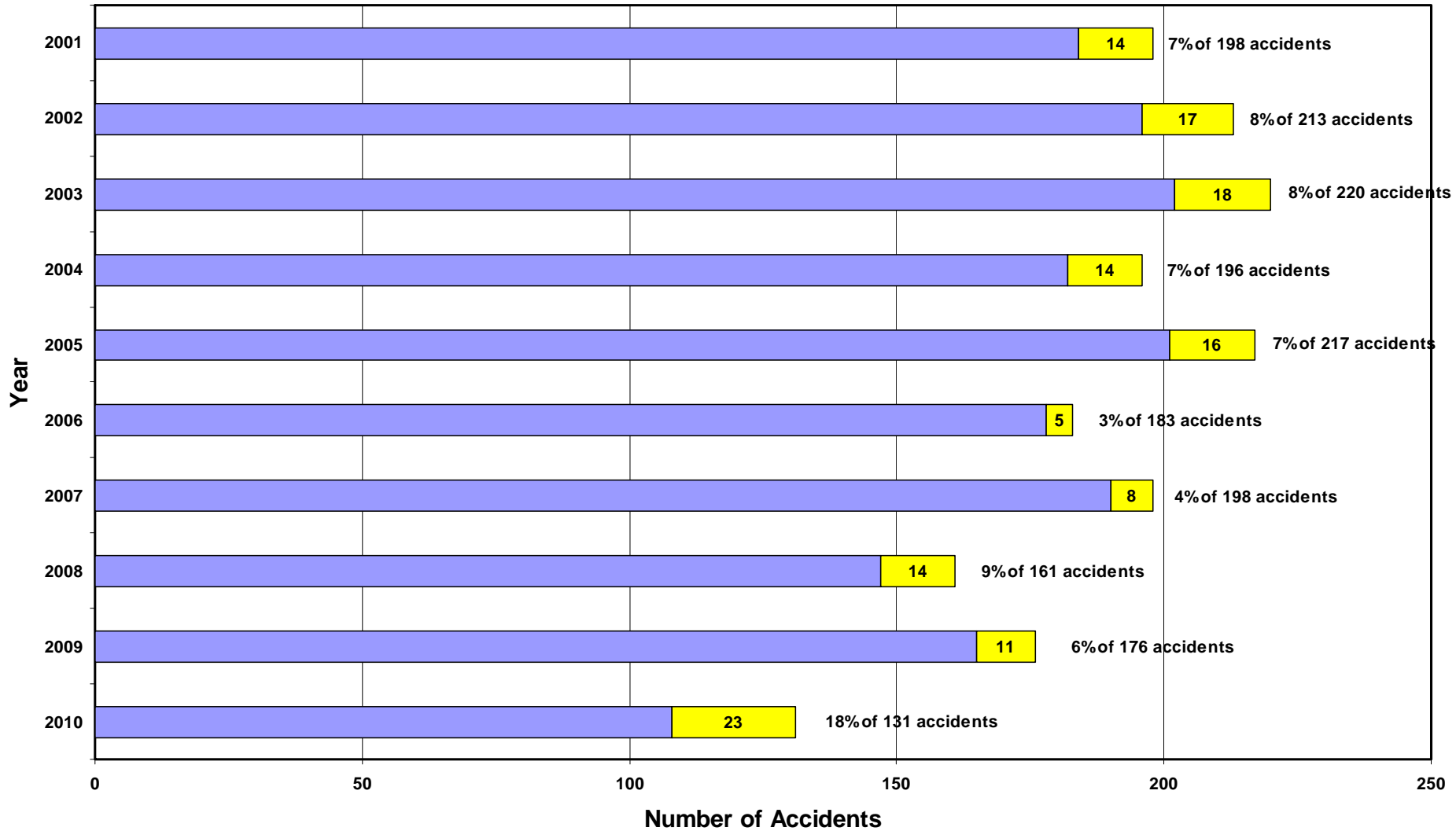
# Agricultural / Restricted Category Aircraft



KA-26

Part 137

## Aerial Application Accidents by Calendar Year



## Summary of Calendar Years 2001-2009 vs 2010

- Aerial Application Accidents: 2001-2009
  - Average of 13 accidents/year
  - Average of 7% of all U.S. helicopter accidents
- Aerial Application Accidents: 2010
  - 23 accidents
  - 18% of all U.S. helicopter accidents

# Restricted Category Operations

External Load (Part 133) and Agricultural (Part 137)

- Higher risk operations
- Aircraft may experience higher loads than other type operations
- Over 60 Restricted Category Type Certificates
- Over 200 Restricted Category aircraft
- Historically higher number of accidents
- More oversight and more stringent requirements for certifying aircraft
- Order 8110.RC
- Higher number mechanical causes of accidents

# Traceability of Parts







**Can you spell RESTRICTED?**



**What's in your belly?**





**Corrosion?**

TCA 01:00.00.08



PROPERTY OF  
GREYSTONE COMMUNICATIONS, INC.  
COMMERCIAL USAGE PROHIBITED

# NTSB

- FTW00RA093
- On May 17, 1999, at 1105 eastern standard time, a Bell 206L4 helicopter, Ecuadorian registration HC-BYQ (serial number 52207), was substantially damaged during impact with water following a loss of control while attempting to takeoff from a remote high altitude field site near Cuenca, Ecuador. The commercial pilot and one of his passengers sustained serious injuries, while two other passengers sustained minor injuries. The helicopter was owned and operated by ICARO S.A, an Ecuadorian air taxi operator based in Quito, Ecuador. Visual meteorological conditions prevailed for the air taxi flight. The flight, which was destined for Guayaquil, Ecuador, was originating at the time of the accident.

The investigation is under the jurisdiction of the Government of the Republic of Ecuador. Any further information may be obtained from:

Direccion General de Aviacion Civil (DGAC) Departamento de Seguridad de Vuelo  
Buenos Aires 149 y calle 10 de Agosto P.O. Box 2077 Quito, Ecuador

This report is for informational purposes only and contains only information released by or obtained for the Government of Ecuador.

# Where to go to find out more!!



<http://www.rotor.com/>



<http://www.topsafety.org/>



<http://www.ihst.org/>



<http://www.amsac.org/>



**Helicopter Safety Advisory Conference (HSAC)**

<http://www.hsac.org/>

# Real comments that keep us up at night!!

- “ .. How long do we have to be in the clouds to be considered IFR??”
- “.. When the wx gets bad, we just go lower..”
- “ we knew if it was going to happen (the accident) it would be him..”
- “ it doesn’t look good, .... But lets give it a try!!”
- “ ..go ask the mechanic how much longer, I don’t care if it has only been ten minutes, it is almost rush hour..”
- “..We have always done it that way....”
- “.. Yes we’ve had accidents, but some are going to happen..”

## ***SAFETY CULTURE!!***

# Questions/Comments

**Contact:**

**[Matthew.rigsby@faa.gov](mailto:Matthew.rigsby@faa.gov) (817-222-5125)**





Thank you!!!!